PROGRAM CHARTER

FOR

Climate Predictions and Projections Program

Program Manager: Ants Leetmaa

Climate Goal Team Lead: Chester J. Koblinsky

1. EXECUTIVE SUMMARY

Program Description

The mission requirements of the Climate Predictions and Projections Program are to provide climate forecasts for multiple time-scales to enable regional and national managers to better plan for the impacts of climate variability, and provide climate assessments and projections to support policy decisions with objective and accurate climate change information. Following these requirements, this program provides the nation with a seamless suite of environmental forecasts (i.e. outlooks and projections) on intraseasonal, seasonal, interannual, and multi-decadal timescales and on regional, national, and global spatial scales. The global environment includes not only the atmosphere, hydrosphere, cryosphere, biosphere, and lithosphere, but also land/ocean biogeochemical processes, ecosystems, atmospheric chemistry and air quality. This program resides under the NOAA Climate Goal. To achieve its objective, this program maintains a suite of operational climate outlooks and strives to implement the next generation operational climate outlooks and assessments by improving climate models, improving forecast generation techniques, and maintaining real-time climate monitoring data sets. Activities under this program are spread across several line offices and NOAA laboratories, and also support, and leverage on, an extensive array of competitively reviewed research. Outcomes of this program depend on activities under the following Climate Goal Programs: the Climate Observation and Analysis Program and the Climate Forcing Program.

Program URL: http://www.climate.noaa.gov/prediction.html

2. PROGRAM REQUIREMENT DRIVERS

A. Legislative and Directive Documents establishing needs and requirements:
Legislation:

- *Global Change Research Act (15 U.S.C. 2921 et seq.):* This act mandates the development of a research program whose goal is to understand climate variability and its predictability.
- *Weather Service Organic Act (15 U.S.C. 313 et seq.):* Outlines NOAA's responsibility to produce climate forecasts as well as to monitor and record climate information used in assessment products.

- *Coastal Zone Management Act (16 U.S.C. 1451 et seq.):* Requires understanding and predicting long-term climate change which may have large impacts in the coastal zone such as global warming and associated sea level rise.

Interagency or International Agreements

- *Strategic plan for the Climate Change Science Program (CCSP):* requires reduced uncertainty in projections of how the Earth's climate and related systems may change in the future.

B. Mission Requirements

1. To understand and predict climate variability on timescales ranging from intraseasonal through seasonal to decadal and beyond. [Global Change Research Act]

2. To monitor, assess, and forecast climate. [Weather Service Organic Act]

3. To understand and predict long-term climate change and evaluate its impacts on the coastal zone. [Coastal Zone Management Act]

4. To improve climate models to reduce uncertainty in the projections of Earth's climate. [Strategic plan for the Climate Change Science Program (CCSP)]

5. To improve knowledge of observed variability and change of the Earth's past and present climate and environment. [Strategic plan for the Climate Change Science Program (CCSP)]

3. LINKS TO THE NOAA STRATEGIC PLAN

A. Goal outcomes: The specific outcome for Climate Predictions and Projections is to develop, improve, and maintain "A predictive understanding of the global climate system on time scales of weeks to decades with quantified uncertainties sufficient for making informed decisions" and thereby ensuring that "climate–sensitive sectors and climate-literate public effectively incorporate(s) NOAA's climate products into their plans and decisions."

B. Goal Performance Objectives: Outcomes of this program can be identified with the following performance objectives for the Climate Goal: "Improve climate predictive capability from weeks to decades, with an increased range of applicability for management and policy decisions" ; "Reduce uncertainty in climate projections through timely information on the forcing and feedbacks contributing to changes in the Earth's climate"; "Increase number and use of climate products and services to enhance public and private sector decision making."

C. Goal Strategies: To achieve its objectives, this program relies on the following strategies: advance sub-seasonal to inter-annual climate predictions and climate change projections by improving analysis of the climate system, using ensembles of multiple, high-end climate models; develop and contribute to routine state-of-the-science assessments of the climate system for informed decision making; research to understand past, present, and future climate fluctuations; and coordinate among NOAA line offices the transition from investigator-driven research projects to operational facilities, capabilities, and products.

4. PROGRAM OUTCOMES

Long-term outcomes of this program are:

- A capability to produce routine climate change projections and "If…Then" scenarios with defined uncertainties in support of making informed policy decisions to mitigate societal impacts of climate trends
- A capability to produce operational climate outlooks and applications with defined uncertainties on intraseasonal, seasonal, and decadal time-scales to enable national managers to take proactive actions in response to the impacts of climate variability.

5. PROGRAM ROLES AND RESPONSBILITIES

This program is established and managed with the procedures established in the NOAA Business Operations Manual (BOM). Responsibilities of the Program Manager are described in the BOM. Responsibilities of other major participants are summarized below:

A. Participating Line Offices, Staff Office, and Council Responsibilities

- NOAA Research is responsible for providing capabilities for climate diagnostics, climate modeling, and climate projections through Geophysical Fluid Dynamics Laboratory (GFDL) and the Climate Diagnostics Center (CDC). NOAA Research also supports competitively reviewed research and development activities within NOAA and other agency labs and centers, and with the external academic community to enhance the understanding and predictive capability of climate variability and change. Competitive efforts are supported through the Climate Program Office.
- The National Weather Service through the Climate Prediction Center (CPC) and Environmental Modeling Center (EMC) is responsible for providing an infrastructure to maintain operational climate predictions on intraseasonal, seasonal, and interannual time scales, and to provide a vehicle for transitioning products developed under the NOAA research to operations. The NWS Office of Hydrology develops the operational

  hydrologic model capability to translate climate predictions for use in water resource applications.
- The NOAA Office of General Counsel (GC) is responsible for providing legal services necessary to enable the program to discharge its duties.
- The NOAA Research Council provides guidance on research priorities with different time horizons.
- The NOAA Office of Public and Intergovernmental Affairs communicates findings and results to a variety of audiences via the media.

B. External Agency/Organization Responsibilities

- International Research Institute (IRI) for Climate Prediction at Columbia University

provides added capability to understand, anticipate and manage the impacts of climate fluctuations, in order to improve human welfare and the environment.

- Intergovernmental Panel on Climate Change (IPCC) established by the World Meteorological Organization (WMO) and United Nations Environmental Programme (UNEP) coordinates international assessment of scientific, technical and socio- economic information relevant for the understanding of climate change, its potential impacts, and options for adaptation and mitigation.
- Numerous bi and multi-lateral international agreements, e.g., U.S./Canada Weather/ Climate, U.S./Australia Climate Action Partnership, U.S./New Zealand Climate Change Partnership that participate in monitoring prediction of the global climate system provide additional leverage for understanding climate variability and change.
- Various national and international working groups provide community-based science and implementation planning to guide NOAA's funding of climate variability and change research. These include: Climate Research Committee of the National Academy of Sciences/National Research Council; US Interagency Working Groups for the Climate Change Science Program; US Interagency Groups for Climate Variability and Predictability (CLIVAR) and Global Energy and Water Cycle Experiment (GEWEX); World Climate Research Programme, sponsored by the WMO, Intergovernmental Oceanographic Commission (IOC) and the International Council of Scientific Unions (ICSU); US Scientific Steering Committees for CLIVAR and GEWEX.
- Academic and research communities external to NOAA support increased understanding of climate variability and change and development of improved climate prediction techniques via competitive research grants.

6. END USERS OR BENEFICIARIES OF PROGRAM

Products generated by the Predictions and Projections Program benefit end users composed of:

A. General Public, Private Sector, Regional, and National Managers in Water Resources, Ecosystem, Agriculture, Energy, Transportation, and Public Heath Sectors – the program provides operational forecasts and outlooks of intraseasonal to interannual variations and intradecadal trends. Informs and educates public about climate.

B. International Coastal Ecosystem Management, Fisheries, Public Health, Regional and National Managers- the program provides objective information about climate change projections in support of making informed policy decisions related to mitigation and adaptation strategies related to global change.

C. Regional Decision Support, and Climate and Ecosystems Programs under the Climate Goal- the program provides operational climate outlooks necessary to implement a regional decision support and ecosystem management program. The program also provides observational requirements for improving climate outlooks.

Appendix:

Additional Program Requirement Drivers:

- *FY 2004 House CJS appropriations subcommittee report on funding for IRI :* Concluded that IRI funding is to continue at no less than its current level.
- *High-Performance Computing Act of 1991 (15 U.S.C. 5501-5528):* Enables the development of computer architecture and networks necessary for the producing new forecast models.
- *National Climate Program Act (15 U.S.C. 2901 et seq.):* Designed to study climate change by establishing a National Climate Program Office.
- *The National Integrated Drought Information System (NIDIS):* recommendation that NOAA should be the lead federal agency for coordinating implementation of NIDIS.
- *U.S. Commission on* Ocean Policy (An Ocean Blueprint for the 21st Century, Final Report, 2004): Presents a national strategy for conducting research, exploration and marine operations at federal level, in close partnership with academia and private organizations
- *U.S. Bilateral Climate Change Agreements:* Require participation in international activates.